

Long-term impacts and implications of the COVID-19 pandemic on mental health

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Abstract

Studies examining the long-term psychological impact of the COVID-19 pandemic and proposing mechanisms for mitigating the risk of mental health impairment are sorely lacking, especially in low-income countries. To address this gap, the study aimed to examine the severity of anxiety, stress, depression, burnout, exacerbation of pre-existing mental health symptoms and sense of control over the environment, 1 year post- lifting of lockdown restrictions in response to the COVID-19 pandemic in under-resourced communities in Guatemala. Telephone surveys were administered to 100 participants to assess the socio-demographic characteristics, psychosocial functioning and risk and protective factors for psychological distress. Multiple linear regressions were used to examine the predictors of mental health impairment. The findings indicate significant and persistent mental health distress with moderate to high impairment in terms of depression and anxiety, and low to moderate impairment in terms of burnout and stress. The study presents the persistent pandemic-related distress syndrome, implications and practice recommendations.

Keywords: Anxiety, COVID-19, depression, health, mental, pandemic.

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1. Introduction

According to the Ministry of Health, as of June 2022, there have been approximately 865,000 confirmed cases of COVID-19 in Guatemala with approximately 18, 200 deaths (Ministry of Health, 2020). For many communities around Guatemala city, pre-existing pandemic conditions were already perilous and contributed to chronic malnutrition, high rates of non-communicable diseases and mental health stressors. In these ‘red zone’ districts (*highly vulnerable communities*), high rates of extreme poverty, violent and gang-related crime, substance use and limited employment and educational opportunities prevail as do high rates of teen pregnancy, delinquency, violence against women and domestic violence (Alonzo, Popescu, & Zubaroglu, 2021a).

Mitigation efforts implemented during the onset of the pandemic, including shelter-in-place and social distancing measures, further limited employment and education as work and school routines were interrupted. Increased time at home without opportunities for recreational outings and socialisation outside of the home limited the access to typical sources of support (i.e., extended family members, friends etc.) and potential for intervention, further exacerbating the risk of exposure to family violence and mental distress (Bülbül, Demirbaş, & Odabaşı, 2021).

Over the year, research on the impact of the COVID-19 pandemic on mental health functioning has established significant negative mental health consequences related to the onset of the pandemic and ensuing quarantine and lockdown periods. Clinically significant depression and anxiety, along with stress, anger, irritability and fatigue, have been identified as common experiences in multiple countries across Europe, the United States and Asia. Far fewer studies have focused on Latin America and of those, only three focused specifically on Guatemala (Alonzo et al., 2021a, 2021b, 2021c, 2021d).

1.1. Related studies

The findings from the studies examining the mental health of adults living in highly vulnerable communities in Guatemala during the lockdown period found moderate to high rates of anxiety and stress along with significant increases in pre-existing mental health symptoms (Alonzo et al., 2021a, 2021b). More specifically, just under half of the participants (46%) reported high levels of anxiety, 68% reported severe symptoms of stress and 38% reported an increase in pre-existing mental health symptoms. A small percentage of participants endorsed feeling depressed as compared to anxiety or stressed (12%), despite sharing symptoms associated with depression such as sadness, irritability, difficulty sleeping and lack of self-esteem, despite experiencing stressors that are often associated with depression such as loss and separation. Illness-related concerns, economic concerns, distress about the future, frustration with lockdown, boredom and increased workloads were identified by participants as key issues contributing to mental distress. Although to a lesser degree, results also indicated an increase in burnout (19%), particularly among parents (Alonzo et al., 2021c), raising concerns about support and safety in the home.

A follow-up study post-lifting of the lockdown restrictions was conducted to determine whether the mental health distress associated with the social and financial fragmentation experienced during shelter-in-place orders was remediated once such mitigation efforts were removed (Alonzo et al., 2021d). It was hypothesised that, in these communities, the pandemic represented a complex emergency and, consequently, impairments in mental health functioning would endure rather than remit in light of 1) the devastating economic and health/mental health consequences of the pandemic and related mitigation efforts; 2) the scarcity of health and mental health resources to support people in the target communities;

and 3) the increased insecurity stemming from the pre-existing perilous state of RZDs. Indeed, results demonstrated significant increases in all mental health variables from lockdown to post-lockdown periods including anxiety ($p = 0.003$), depression ($p < 0.001$), stress ($p < 0.001$) and burnout ($p < 0.001$). The results further demonstrated that individuals reporting greater control over the environment were approximately 40% less likely to report stress during the post-lockdown period and that this relationship was moderated by the number of people in the household, with a larger number resulting in higher levels of stress.

It is widely acknowledged that mental health sequelae of pandemics will persist for longer and peak later than the actual pandemic. During prior epidemics, the number of people whose mental health was affected was more than the number of people affected by the infection. This begs the question, given the nature and extent of the current pandemic, 1) Will long-term mental health functioning of individuals residing in high-risk communities remain impaired, and to what degree? 2) What are the main stressors related to long-term psychological distress in such communities if any? 3) What type of programming can best support individuals residing in high-risk communities experiencing long-term psychological distress related to the pandemic?

It has been noted that studies examining the long-term psychological impact of the current pandemic and proposing mechanisms for mitigating the risk of impaired mental health functioning are sorely lacking (Gilbody et al., 2021; Alonzo et al., 2022). We were able to locate only one study that examined long-term mental health functioning associated with the current pandemic that was conducted in India. The psychological impact of the pandemic in terms of anxiety and stress was measured at baseline and 1 year. The results of this study indicated that the psychological coping of the participants significantly decreased from baseline to the 1-year follow-up period, particularly among young adults as compared to older adult participants. The results further demonstrated that there was not a significant reduction in either anxiety or stress over the 1-year follow-up period (Ferdosipour & Jahangiri, 2021; Halder, Mahato, & Samajdar, 2021).

1.2. Purpose of the study

To date, no studies have reported on the long-term psychological impact of the COVID-19 pandemic in Latin America, in general, and within high-risk communities, specifically. The current study aimed to fill in this gap in our understanding of the impact of the current pandemic, particularly on vulnerable and marginalised populations. As such, this study aimed to examine adult self-reports of anxiety, stress, depression, burnout, exacerbation of pre-existing mental health symptoms and sense of control over the environment 1 year post- lifting of lockdown restrictions in response to the COVID-19 pandemic in high-risk communities in Guatemala. Given the data on the impact of previous pandemics, research noting increased mental distress post-lockdown in Guatemala, and the limited findings regarding long-term psychological distress and limited coping related to the COVID-19 pandemic, we hypothesise the persistence of high levels of anxiety, stress and burnout, as well as impaired interpersonal and family functioning at the 1-year follow-up period.

2. Materials and methods

2.1. Participants and study design

The COVID care calls (CCC) programme was designed to respond to the pandemic and its complex consequences in high-risk communities in and around Guatemala City, Guatemala. The goal of the CCC programme was to address developing community needs, including 1) identifying the main challenges related to the COVID-19 pandemic for these communities; 2) providing emotional support for people either suffering from symptoms of COVID-19 or showing psychological distress related to living through the pandemic; 3) make referrals for medical and mental healthcare; and 4) prevent the spread of COVID-19 by providing education on evidence-based protective measures, such as social distancing, regular handwashing and mask-wearing.

With the approval of the appropriate Institutional Review Board and in collaboration with Hunger Relief International (HRI) and International Social Work Solutions, a total of 330 individuals from 11 districts in and around Guatemala city participated in the baseline CCC study. Participants were provided with information on the nature of the study and their rights as research participants, and verbal informed consent was secured for all calls. The CCC study entailed making weekly telephone calls to people who HRI served through its various programmes and/or who were referred by community partners. Callers administered a semi-structured interview to elicit information regarding health and mental health, economic status, employment/educational status and to provide information, assistance and appropriate referrals for additional care, as needed. Callers also recorded their observations of participants during the interviews. The study PIs designed the semi-structured interview, trained callers and provided support and supervision to in-country staff. The calls are made by HRI-based social workers and psychology interns.

The baseline survey was administered to 330 individuals from households across 11 districts. Surveys were conducted between June 2020 and September 2020. For the current study, the same procedure of telephone surveying was used and a random sample of 100 baseline participants was included. Calls were administered between June 2021 and August 2021.

2.2. Data collection instrument

The follow-up survey was designed by the study. It was informed by qualitative feedback and quantitative data obtained during the baseline study (see Alonzo et al., 2021a) and by relevant research focused on the impact of previous epidemics (i.e., SARS).

2.2.1. Socio-demographic variables

Participants provided information regarding their sex, age, number of children, number of individuals in the household and having a family member diagnosed with COVID-19 during the pandemic.

2.2.2. Mental health variables

The follow-up survey assessed four mental health domains including anxiety, stress, depression and burnout that were operationalised according to evidence-based, culturally relevant conceptualisations of illness and idioms of distress informed by prior research. All mental health items were rated on a scale of 0–5, where 0 = none and 5 = high. An overall score for each domain was derived by summing the scores on the individual items in the respective domain, with a higher score representing greater impairment.

The depression measure consisted of six items assessing mood, including feeling sad, thinking about not wanting to be alive, feeling hopeless, difficulty sleeping, difficulty eating and difficulty concentrating/paying attention. The anxiety measure consisted of four items targeting feeling anxious, difficulty managing nerves, feeling worried about the future and feeling worried about income. The stress measure consisted of four items targeting feeling overwhelmed, feeling stressed by children, feeling stressed by spouse/partner and difficulty focusing on work/household responsibilities. The burnout measure consisted of four items targeting feeling burned out/fatigued, having difficulty completing work/schoolwork, having difficulty helping children with homework and feeling bored.

2.2.3. Control over the environment

The survey contained 15 items assessing the nature of individual experiences during the lockdown associated with maintaining a sense of control over one's environment. Participants were asked to rate their degree of difficulty in the following areas: balancing family and work, taking care of oneself, finding space to stay alone, finding time to stay alone, talking on the phone with extended family, talking on the phone with friends, doing physical exercise, doing a pleasurable activity, remaining calm, managing mood, maintaining friendships, maintaining employment, planning for the future, cooking and cleaning. Items were rated on a scale of 0–5, where 0 = none and 5 = high. A composite score was then generated for control over the environment by summing the scores on the individual items, with a lower score reflecting feeling less in control over one's environment.

2.3. Data analysis

The statistical analyses were performed using IBM Statistical Package for the Social Sciences Statistics for Windows, version 26 (Stata Corp., 2013). All the tests were two-tailed, with a significance level of $p < 0.05$. Preliminary analyses were conducted to check for normality of continuous variables and homogeneity of variance by means of the Kolmogorov–Smirnov test and Levene's test, with no violations noted. Descriptive statistics (means, standard deviations and percentages) were used to describe the socio-demographic characteristics of the sample. Bivariate analyses examined differences between baseline and the 1-year post-lockdown period assessment period in mental health functioning (anxiety, stress, depression and burnout) using paired sample *t*-tests.

Separate multiple linear regressions were then estimated for each mental health variable to examine the effect of age, sex, number of children, number of people in the household, having a family member diagnosed with COVID-19 during the pandemic and sense of control over the environment. Interaction effects for gender and control over the environment were also examined based on the known association between these characteristics and with these characteristics and mental health impairment at the onset

of the pandemic (see Alonzo et al., 2021a). Main and interaction effects (unstandardised β -coefficients) and p -values of each predictor and adjusted squares of each model are reported. The level of significance was set to $p = 0.05$.

3. Results

Table 1 reports the socio-demographic and clinical characteristics of the sample. Participants were largely female (70%), with an average age of 35 (± 11.88). The majority of participants lived with family (73%). Just under 40% reported having children under the age of 18 living in the home and 21% reported having family members over 60 years old living in the home. Participants reported moderate to high levels of impairment in anxiety (average score of 12 out of 20) and depression (average score of 16 out of 30), and low to moderate levels of stress (average score of 8 out of 20) and burnout (average score of 9 out of 20) at the 1-year assessment period.

Table 1. Socio-demographic and clinical characteristics of the sample

Socio-demographic characteristic	N (%)	Mean (\pm SD)
Age (in years)		35.04 (± 11.876)
Sex		
Female	47 (70%)	
Male	20 (30%)	
Lives with family		
Yes	42 (73%)	
No	25 (37%)	
Family member with COVID-19		
Yes	28 (33%)	
No	55 (66%)	
Relatives under 18 years old in household		
Yes	25 (37%)	
No	42 (63%)	
Relatives over 60 years old in household		
Yes	14 (21%)	
No	53 (79%)	
Number of children		1 (± 1)
Control over the environment		43.67 (13.67)
Anxiety		12.54 (± 5.02)
Depression		15.73 (± 7.99)
Stress		8.30 (± 4.56)
Burnout		9.17 (± 4.17)

Table 2 presents the results of the bivariate analyses. Paired sample t -tests were conducted to analyse the change in scores of the mental health variables from baseline to the 1-year assessment period. The results demonstrated significant increases in all mental health variables from lockdown to post-lockdown periods, including anxiety ($p < 0.001$), depression ($p < 0.001$), stress ($p < 0.001$) and burnout ($p < 0.001$).

Table 2. Changes in mental health symptoms pre- and post-lockdown measures

Mental health variable	Baseline (n = 330)		1 year (n = 100)		Comparison			
	Mean	SD	Mean	SD	t	df	p	Cohen's d
Anxiety	3.38	2.13	11.93	5.44	-16.387	66	<0.001	5.58
Depression	0.75	0.87	15.59	8.23	-13.709	54	<0.001	8.32
Stress	1.05	1.82	8.43	4.61	-12.046	64	<0.001	4.94
Burnout	0.42	0.68	9.20	4.51	-15.560	65	<0.001	4.58

Table 3 reports the results of the multiple linear regression examining predictors of anxiety at 1-year post onset of the pandemic. The results indicate that the overall model includes age, sex, number of children, number of people in the household, having a family member diagnosed with COVID-19 during the pandemic, sense of control over the environment and the interaction term of sex and control over the environment was significant ($p < 0.001$) and the model explained 71% of the variance in anxiety. A significant main effect was found for control over the environment (OR = 0.830; $p < 0.001$), indicating that individuals reporting more control over the environment were approximately 83% more likely to report depression. A significant main effect was also found for age (OR = 0.143; $p = 0.050$), indicating that older individuals were 14% more likely to report anxiety. There was no interaction effect in this model ($p = 0.485$) and both main effects remained significant ($p = 0.044$ and $p = 0.003$, respectively) when the interaction was included in the model.

Table 3. Multiple regressions for predictors of anxiety

Variables	Model without interaction				Model with interaction			
	β	t	p	Adj. R ²	β	t	p	Adj. R ²
Anxiety			<0.001	0.709			<0.001	0.711
Sex	0.017	0.234	0.816		-0.124	-0.578	0.566	
Age	0.143	2.002	0.050		0.148	2.055	0.044	
Family member with COVID-19	0.022	0.307	0.760		0.195	0.846		
No. of children	0.080	0.778	0.440		0.072	0.695	0.490	
No. of people household	-0.081	-0.807	0.423		-0.085	-0.847	0.400	
Control over environment	0.830	11.426	<0.001		0.682	3.057	0.003	
Sex x Con. Environ.					0.196	0.702	0.485	

Table 4 reports the results of the multiple linear regression examining predictors of depression at 1-year post onset of the pandemic. The results demonstrate that, once again, the overall model included age, sex, number of children, number of people in the household, having a family member diagnosed with COVID-19 during the pandemic, sense of control over the environment as well as the interaction term of sex by control over the environment was significant ($p < 0.001$) and the model explained approximately 60% of the variance in depression. A significant main effect was found only for control over the

environment (OR = 0.748; $p < 0.001$), indicating that individuals reporting more control over the environment were approximately 75% more likely to report depression. The interaction effect was not significant ($p = 0.736$), but once entered into the model, the main effect for control over the environment remained significant ($p = 0.033$).

Table 4. Multiple regressions for predictors of depression

Variables	Model with no interaction				Model with interaction			
	β	t	p	Adj. R^2	β	t	p	Adj. R^2
Depression			<0.001	0.540			<0.001	0.531
Sex	-0.013	-0.133	0.895		-0.097	-0.363	0.718	
Age	-0.101	-1.073	0.289		-0.100	-1.052	0.298	
Family member with COVID-19	0.076	0.784	0.437		0.069	0.693	0.492	
No. of children	0.051	0.382	0.704		0.046	0.338	0.737	
No. of people household	0.011	0.085	0.933		0.007	0.053	0.958	
Control over environment	0.748	7.842	<0.001		0.653	2.199	0.003	
Sex x Con. Envir.					0.125	0.339	0.736	

Table 5 reports the results of the multiple linear regression examining predictors of stress at 1-year post onset of the pandemic. The results show that, consistent with the other models, the overall model included age, sex, number of children, number of people in the household, having a family member diagnosed with COVID-19 during the pandemic, sense of control over the environment as well as the interaction term of sex by control over the environment was significant ($p < 0.001$) and the model explained approximately 46% of the variance in stress. Main effects were found for several children (OR = 0.384; $p = 0.008$), indicating that individuals with more children were approximately 40% more likely to report stress; having a family member diagnosed with COVID-19 (OR = 0.386; $p < 0.001$), indicating that individuals with more children were just under 40% more likely to report stress; and, control over the environment (OR = 0.458; $p < 0.001$), indicating that individuals reporting more control over the environment were approximately 46% more likely to report stress. The interaction effect was not significant ($p = 0.977$) and when entered into the model, only the main effects for having a family member diagnosed with COVID-19 and control over the environment remained significant ($p = 0.009$ and $p < 0.001$, respectively).

Table 5. Multiple regressions for predictors of stress

Variables	Model with no interaction				Model with interaction			
	β	t	p	Adj. R^2	β	t	p	Adj. R^2
Stress			<0.001	0.410			<0.001	0.400
Sex	-0.163	-1.606	0.114		-0.171	-0.588	0.559	

Variables	Model with no interaction				Model with interaction			
	β	t	p	Adj. R^2	β	t	p	Adj. R^2
Age	0.119	1.217	0.229		0.119	1.203	0.234	
Family member with COVID-19	0.386	3.900	<0.001		0.385	3.807	<0.001	
No. of children	0.384	2.757	0.008		0.384	2.715	0.009	
No. of people household Control over environment	-0.125	-0.913	0.365		-0.125	-0.905	0.369	
	0.458	4.607	<0.001		0.450	1.461	0.149	
Sex x Con. Envir.					0.011	0.029	0.977	

Table 6 reports on the results of the multiple linear regression examining predictors of burnout at 1-year post onset of the pandemic. Again, the overall model included age, sex, number of children, number of people in the household, having a family member diagnosed with COVID-19 during the pandemic, sense of control over the environment as well as the interaction term of sex by control over the environment was significant ($p < 0.001$) and the model explained approximately 50% of the variance in burnout. The main effect was found for sex (OR = -0.251; $p = 0.012$), indicating that females were 25% more likely to report burnout than males. The main effect was also found for control over the environment (OR = 0.606; $p < 0.001$), indicating that individuals reporting more control over the environment were approximately 60% more likely to report burnout. The interaction effect was once again not significant ($p = 0.321$), and once entered into the model, only the main effect for control over the environment remained significant ($p = 0.004$).

Table 6. Multiple regressions for predictors of burnout

Variables	Model with no interaction				Model with interaction			
	β	t	p	Adj. R^2	β	t	p	Adj. R^2
Burnout			<0.001	0.451			<0.001	0.451
Sex	-0.251	-2.591	0.012		0.011	0.040	0.968	
Age	0.109	1.167	0.248		0.099	1.059	0.294	
Family member with COVID-19	0.098	1.031	0.307		0.112	1.172	0.246	
No. of children	0.195	1.459	0.150		0.209	1.559	0.125	
No. of people household Control over environment	-0.009	-0.071	0.943		-0.001	-0.007	0.994	
	0.606	6.375	<0.001		0.880	3.031	0.004	
Sex x Con. Envir.					-0.364	-1.002	0.321	

4. Discussion

This is the first study to report on the long-term psychological impact of the COVID-19 pandemic on individuals residing in high-risk communities in Guatemala or Latin America, in general. At baseline, we found that high levels of anxiety and stress were significant, with women and older adults reporting higher levels of stress and anxiety related to the onset of the pandemic. Findings from the current study indicate that more than 1 year later, individuals report significant and persistent mental health distress with moderate to high impairment in terms of depression and anxiety and low to moderate impairment in terms of burnout and stress.

While a significant body of research has examined the psychological impact of the pandemic, the majority of studies have examined mental health functioning during the first phase of the pandemic when mitigation efforts were strongly enforced, largely during quarantine periods, lockdown periods and when social distancing was mandated. Overall, this research has consistently identified significant psychological distress related to the onset of the pandemic (especially related to periods of quarantine) including stress, depression, irritability, insomnia, fear, confusion, anger, frustration, boredom and stigma, some of which persisted even after the quarantine was lifted (Alonzo et al., 2021a, 2021b, 2021c, 2021d; Bai et al., 2004; Brooks et al., 2020; Chatterjee & Chauhan, 2020; Hawryluck et al., 2004). Stressors most often related to these outcomes included longer duration of confinement, inadequate resources to meet basic needs, difficulty securing medical care and medications and financial hardships (Brooks et al., 2020). Research examining the long-term mental health impact of the pandemic is far more limited and none were identified in low-income countries. This study extends these findings of significant depression, anxiety, stress and burnout to the post-mitigation period and highly under-resourced settings.

We also found that one's sense of control over the environment was one of the strongest predictors of mental health functioning at follow-up, however not in the anticipated direction. In this study, more control over the environment was associated with greater depression, stress and burnout. It may very well be that individuals who feel more control also feel more responsibility, which takes a negative toll on mental health functioning during times of crises and uncertainty when day-to-day tasks become inconsistent and difficult to carry out. Indeed, prior research has established an association between greater childcare responsibility and lower well-being, and greater psychological distress (Jones & Prinz, 2005). Furthermore, self-efficacy in work and parental roles is a significant predictor of women's work-family conflict and role overload (Erdwins, Buffardi, Casper, & O'Brien, 2004; Kovacs, 2020).

Lastly, research on the agency may lend an understanding to this finding. The agency is said to reflect one's sense of 1) control over actions and environment and 2) ability to influence the outside world (Moore & Fletcher, 2012). In the context of the current pandemic, it may be that one may feel a sense of control over the environment but may not endorse the related ability to influence the outside world in a meaningful way, resulting in feelings of depression, anxiety, stress and/or burnout.

It is not difficult to identify the potential triggers of ongoing mental health distress. New variants of the virus, ongoing uncertainty regarding employment, deteriorating finances, limitations on activities of daily living and recreation, concerns regarding children's education, doubts regarding the efficacy of vaccines and/or boosters, relentless media coverage of virus case counts and deaths compound and contribute to the ongoing psychological distress, what we refer to as persistent pandemic-related distress syndrome

(PPRDS). PPRDS is characterised by persistent mental health impairment in the face of a prolonged and ongoing global crisis with the unpredictability of resolution in terms of timing and impact. Individuals with PPRDS report a combination of physical and psychological symptomatology that include difficulty sleeping, restlessness, difficulty concentrating, irritability, a sense of doubt and uncertainty about the future (distinct from hopelessness), depressed mood, anxiety and a general lack of motivation. Symptoms are consistently present for at least 6 months, most of the day, every day.

Research demonstrates that some individuals are more psychologically resilient to adversity than others (Sominsky et al., 2020) and has shown an inverse relationship between psychological resilience and psychological distress in relation to cases of natural disasters, such as the 2010 Haiti Earthquake (Blanc et al., 2016) or the 2005 Hurricane Katrina. It may be that in low-resource communities characterised by pre-existing conditions of chronic deprivation, community and intra-familial violence and extreme poverty opportunities to build resilience and develop and implement meaningful life choices are so limited by context and circumstance that one's sense of competence and ability to manage a new crisis is compromised. This, coupled with the pandemic mitigation policies restricting socialisation, further limited access to one's supportive social network. This lack of opportunity to develop skills and personality traits to support resilience combined with limited resources and restricted social networks contributes to the development of PPRDS.

It is important to note that traditional psychosocial treatment for standard depression and anxiety may not be effective for PPRDS. Evidence-based practices for treating depression and anxiety often involve focusing on irrational beliefs related to fear, danger, safety and security and challenging cognitive distortions, such as catastrophising, over-generalising and jumping to conclusions (Bülbul et al., 2021). However, given the uncertainty regarding COVID-19, particularly around means of transmission, rate of spread, development of new variants and when it will resolve, and the overall novelty of the illness, promote a general lack of understanding regarding the nature of COVID-19, making it difficult to gather the evidence needed to counter maladaptive and/or irrational beliefs and develop realistic, balanced alternatives that could reduce associated symptoms of depression and anxiety. This suggests the need to develop novel strategies and techniques for addressing PPRDS. Rather than relying on gathering evidence and challenging irrational thoughts, an approach that supports individuals in managing uncertainty is especially relevant. Developing coping skills that allow individuals to effectively manage their work/home life, developing consistent routines that can be maintained even in the face of potential new mitigation efforts and identifying areas in which the individual does maintain control, despite all the uncertainty, will be critical for managing and decreasing the risk of prolonged mental health impairment in the face of the pandemic.

In high-risk communities characterised by pre-existing macro- and mezzo-level challenges, interventions that do not rely on formal mental services are even more important to consider. One such approach might centre on utilising technology to provide services in under-resourced communities. Although mobile technologies for mental health service delivery have proliferated during the pandemic, access to these mobile technologies for those living in highly vulnerable communities may serve as a barrier to their uptake and effectiveness. In the red zone districts of Guatemala, for example, where economic resources are scarce; Internet service is often unstable; and access to computers in a private setting that would facilitate a virtual treatment session is particularly challenging. That being said, access to cell phones and mobile devices is widespread even in marginalised, low-resourced communities in Guatemala (Domek et

al., 2018; Duffy, Svenson, Chavez, Kelly, & Wise, 2019; Prieto et al., 2017). Prior studies in Guatemala of physical health interventions (i.e., diabetes management) that are used on mobile technology have been implemented successfully, demonstrating widespread access to mobile devices, a preference for mobile over traditional forms of communications by users, and providing evidence for the feasibility and acceptability of a mobile-based intervention such as the one we propose (Domek et al., 2018; Duffy et al., 2019; Prieto et al., 2017). Understanding these issues can directly inform the provision of relevant services.

5. Conclusion

The development of outreach strategies for identifying individuals struggling with PPRDS is critical to identifying and supporting those struggling with long-term impairment. Ensuring that those individuals at the most risk get the treatment needed to address their mental health and well-being is essential and should include enhanced public health efforts to increase awareness, encourage help-seeking and improve access to psychological services.

Some important methodological limitations should be noted when considering our findings. First, we focused on individuals residing in high-risk communities in a low-income country. As such, findings may not generalise the findings to individuals residing in high-income countries or within high-risk, low-income communities within high-income countries as their mental health profiles may differ. Next, we examined mental health functioning 1-year post onset of the pandemic. Further research with ongoing, prospective follow-up periods is necessary to understand the extent to which mental health impairment persists. Third, data were collected via participant self-report and therefore subject to recall bias. That being said, it has been emphasised that bias in the recall of adverse experiences is a sufficient issue to invalidate studies that employ this data collection method.

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